

IN THE CLAIMS:

Amend claims 1-8, 31-35 and 37 and cancel claim 36 without prejudice or admission as shown in the following listing of claims, which replaces all previous versions and listing of claims in this application.

1. (currently amended) A method of ~~surface or~~ cross-sectional processing and observation comprising:

a first step of processing at least one predetermined area in a surface of a sample to form a target ~~surface or~~ cross-section; and

a second step of observing the target ~~surface or~~ cross-section by scanning the target ~~surface or~~ cross-section with a probe of a scanning probe microscope and detecting a physical quantity produced between the probe and the target ~~surface or~~ cross-section.

2. (currently amended) The method of ~~surface or~~ cross-sectional processing and observation of claim 1; wherein in the first step the ~~desired~~ predetermined area is processed by etching the ~~desired~~ predetermined area with a focused energy beam.

3. (currently amended) The method of ~~surface or~~ cross-sectional processing and observation of claim 2; wherein the focused energy beam is a focused ion beam.

4. (currently amended) The method of ~~surface-or~~ cross-sectional processing and observation of claim 3; wherein the first step includes a step of decomposing an organic metal gas with the focused ion beam in a predetermined location of the sample to make an electrode and an interconnect after carrying out the etching process with the focused ion beam.

5. (currently amended) The method of ~~surface-or~~ cross-sectional processing and observation of claim 1; wherein the first and second steps are carried out using a system for ~~surface-or~~ cross-sectional processing and observation, the system having a unit for processing the surface of the sample to expose a target ~~surface-or~~ cross-section thereof, and a scanning probe microscope unit for observing the target ~~surface-or~~ cross-section.

6. (currently amended) A method of ~~surface-or~~ cross-sectional processing and observation comprising:

a first step of processing at least one predetermined area in a surface of a sample to expose a target ~~surface-or~~ cross-section;

a second step of removing a damaged portion remaining in the exposed ~~surface-or~~ cross-section and then forming a stepped portion according to a difference in materials among layers forming the exposed ~~surface-or~~ cross-section; and

a third step of observing the exposed ~~surface or~~ cross-section with a scanning probe microscope.

7. (currently amended) The method of ~~surface or~~ cross-sectional processing and observation of claim 6; further comprising a step of finishing the exposed ~~surface or~~ cross-section into a mirror face before the stepped portion is formed.

8. (currently amended) The method of ~~surface or~~ cross-sectional processing and observation of claim 2; wherein the first step and the second step are repeated sequentially.

9. - 30. (canceled).

31. (currently amended) The method of ~~surface or~~ cross-sectional processing and observation of claim 1; wherein the physical quantity is a physical quantity relating to an electric and magnetic solid state property of the sample ~~such as~~ selected from the group consisting of an electrical conductivity, a dopant concentration, a dielectric constant, a potential, a leaking magnetic field, and a spin interaction of the sample.

32. (currently amended) A The method of ~~surface or~~ cross-sectional processing and observation of claim 1; wherein the physical quantity is a physical quantity relating to a

mechanical solid state property of the sample ~~such as~~ selected from the group consisting of a hardness, a friction, and an elasticoviscosity of the sample.

33. (currently amended) A The method of ~~surface or~~ cross-sectional processing and observation of claim 1; further comprising the step of observing a position of the probe using a microscope unit and controlling the position of the probe in accordance with observed information obtained from the microscope unit.

34. (currently amended) A The method of ~~surface or~~ cross-sectional processing and observation of claim 33; wherein the microscope unit comprises an optical microscope.

35. (currently amended) A The method of ~~surface or~~ cross-sectional processing and observation of claim 33; wherein the microscope unit comprises a scanning electron microscope.

36. (canceled).

37. (currently amended) The method of ~~surface or~~ cross-sectional processing and observation of claim 7; wherein the step of finishing the exposed ~~surface or~~ cross-section into a mirror face is conducted by irradiating an electron beam in parallel with blowing of etching gas.